The ECU+ Fuel/Timing/Datalogging Piggyback Engine Computer

Version 2.10 Upgrade Guide

07/24/07

Table of Contents

1 Introduction

This upgrade guide describes what's new in the ECU+ firmware and software, version 2.10. Version 2.10 is a major update to the ECU+ firmware and software with many new features and some incompatibilities. This guide is designed to be everything you need to know to update to the new firmware and software.

2 What's New

The ECU+ firmware and software version 2.10 is a major update to the ECU+. It includes much new functionality, including:

- Offline editing of settings.
- GUI installer.
- Gradient-colored maps.
- Launch control and no-lift shifting.
- Completely re-done settings windows.
- All-in-one view.
- Two sets of fuel and timing maps, switchable based on a variety of inputs.
- Log file trimming.
- Vacuum as well as boost logging.
- More MAP sensors supported, and a custom option added for fine tuning.
- ROM editing and map tracing on the EVOs.
- Additional widebands now supported, including the LC-1.
- GM 3.5” MAS translation on the EVOs.
- MUT-II logging, including knock sum.
- Better P0300 suppression, especially for 2G DSMs with the 6-bolt swap.
- Several bugs fixed.

In addition to the new features, one feature was removed:

- No more Palm support.

Palm support may return in the future, but for now the work in maintaining two separate independent pieces of software was deemed to be not worth it, based on customer feedback.

A complete list of new features and links to some of the discussions of these features is available in the ECU+ forums, at

http://www.ecuplus.com/forums/viewtopic.php?t=630

3 Hardware Requirements

The new version 2.10 firmware/software release requires the “silver box” ECU+ hardware, and will not work on the “black box” units.

One set of changes was made during silver box production that introduced new hardware features, and the version 2.10 firmware/software release begins to take advantage of these new features. As such, there are two “types” of ECU+ silver boxes, and the type of box is determined by the unit's serial number, which can be found on the *Miscellaneous* tab of the ECU+ Win software's head unit settings dialog.

- Serial number 2000 through 2099. These are the original design of the silver box hardware.
- Serial number 2100 and higher. These are the most recent design of the silver box hardware.

The original design (S/Ns 2000-2099) is missing a few hardware features that are available in the later hardware. If you have one of these early ECU+ silver boxes, you have two choices:

1. Live without the additional hardware features (and the software features that take advantage of the hardware).
2. Send the unit in for an upgrade.

Hardware upgrades can be done to the original design of the ECU+ silver box to bring its hardware into parity with the most recent design. To request and upgrade, send an e-mail to support@ecuplus.com to arrange shipment. The cost is $20, which includes shipping. Upgrades take a week or so.

If you choose not to update the hardware of an original design ECU+, two capabilities in the version 2.10 firmware/software will not be available:

- The no-lift-to-shift feature. This feature uses the clutch switch input, which isn't available on the original design of the ECU+ silver box.
- Fuel and timing maps won't be switchable via an external switch. This external switch input isn't available on the original design of the ECU+ silver box. Map switching is still possible without this input, but the ECU+ won't be able to use an external stimulus to switch maps.

There's also one other input and output missing from the original design of the ECU+ silver box, but nothing in the version 2.10 firmware/hardware takes advantage of the missing pins yet. There's a good chance that the next firmware/software release will utilize these pins, however.

If you have an original design ECU+, it's *highly* recommended that you send your unit in for upgrade soon. At some point, hardware upgrades will no longer be offered.

4 Jumper Changes

Inside the silver box ECU+ are several “jumpers” (shorting blocks, which short two circuit board pins together) that may need to be modified to get the ECU+ silver box to work with the version 2.10 firmware and hardware. Most cars won't need to alter the jumper settings, so read this section completely before removing the ECU+ silver box from your car.

4.1 Removing and Opening the Silver Box

To inspect or alter the jumper settings of the ECU+ silver box circuit board, simply:

1. Remove the silver box from your car. Both the black (low current) and gray (high current) connectors can be released from the silver box to aide removal. For the black connector, “wiggle” it out underneath the “arms” that extend out of the silver box. (Some silver box

ECU+'s don't have arms.) For the gray connector, squeeze the tab on the top of the connector and wiggle the connector free.

2. Remove the four end panel screws on each end of the box and remove both end panels.
3. Slide out the ECU+ circuit board from the box. Be very careful with this board, as static electricity can destroy the board.

4.2 Jumper Positions

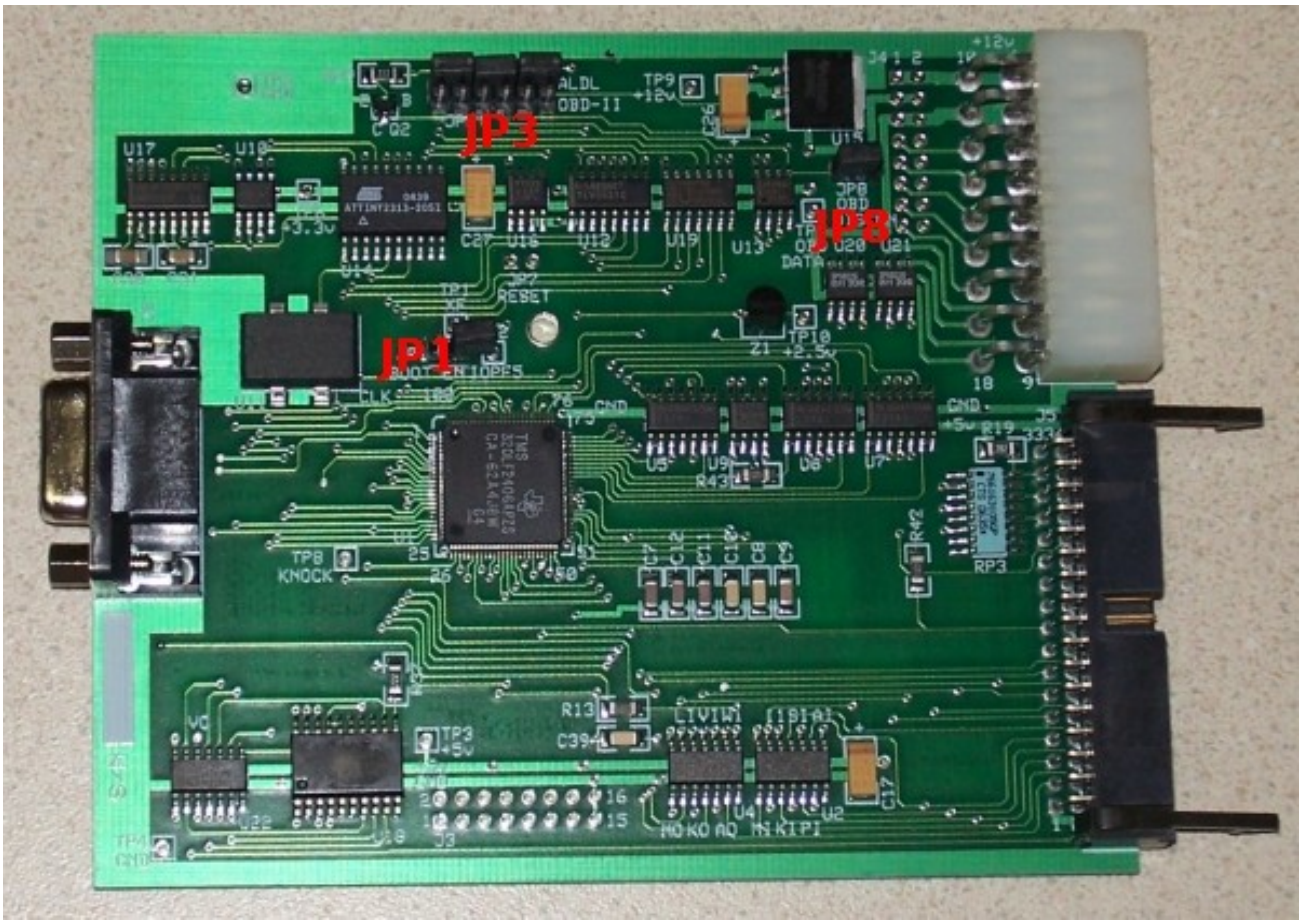

Illustration 1 - Jumper locations

Illustration 1 Shows an ECU+ circuit board, and the locations of JP3 and JP8. These are the two jumpers that may need to be modified.

4.3 JP8, the OBD Disconnect Jumper

Jumper JP8 (top right of the board) is the so-called *OBD-II Disconnect* jumper. On some of the ECU+ circuit boards with S/Ns of 2000-2099, this jumper is not shorted (connected) at the factory. To correct this, simply jumper the two pins of JP8 together with the jumper plug that's “hanging” off of one of the JP8 pins. A shorted JP8 is shown in Illustration 2 below.

Illustration 2 - Connecting JP8

This jumper was disconnected on ECU+'s that shipped with version 2.03 or earlier of the ECU+ firmware and software. If you have a ECU+ with a serial number of 2100 or higher, **or** you have an ECU+ in which the OBD-II functionality (2G DSMs and the EVOs) works, this jumper is set properly and does not need to be changed.

4.4 JP3, the OBD Mode Jumpers

Jumper JP3 (top center of the board) is the so-called OBD Mode jumper. This set of three jumpers swaps in the hardware necessary to allow the ECU+ 's OBD port to talk to your stock ECU for OBD-II screens and MUT-II datalogging. Two jumper configurations are supported:

1. *ALDL* mode, used for the 1G DSMs.
2. *OBD-II* mode, used for the 2G DSMs and the EVOs.

All ECU+'s are shipped from the factory with the jumpers in the *OBD-II* mode position. Before version 2.10 of the ECU+ firmware and software, the ECU+ didn't support the 1G DSM mode of operation, so *OBD-II* mode was always configured at the factory. Now that the ECU+ does support the 1G DSM mode of operation, these jumpers must be changed for the 1G DSM owners.

If you have a 2G DSM or EVO stock ECU, no changes to these jumpers need to be made. If your stock ECU is from a 1G DSM, you'll need to alter the JP3 jumper configuration to use *ALDL* mode. The figures below illustrate the jumper configuration for the two modes.

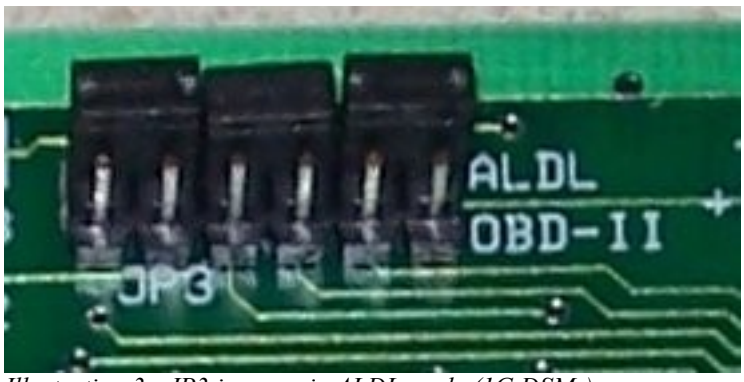

Illustration 3 - JP3 jumpers in ALDL mode (1G DSMs)

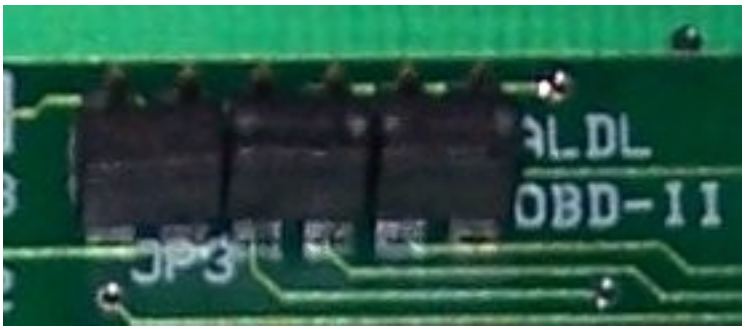

Illustration 4 - JP3 jumpers in OBD-II mode (2G DSMs and the EVOs)

4.5 Reinstalling the Silver Box

After verifying or altering the jumper settings, simply reverse the procedure outlined in the section Removing and Opening the Silver Box on page 4 to reinstall the ECU+ in your car.

5 Saving Your Configuration Settings (Required)

The ECU+ version 2.10 firmware and software introduces a completely new format for the head unit settings stored inside the ECU+ silver box. **Before** replacing your firmware and software with that of version 2.10, you **must** save your current ECU+ head unit settings to a file on your laptop. To do so:

1. Connect your ECU+ black box to a laptop, and start up the ECU+ Win software (version 2.05 or earlier).
2. Use the *Settings->ECU+ Head Unit* menu item to bring up your current head unit settings.
3. On the *Fuel Maps* tab, click the *Save* button, and save your settings to a file named

   pre-v210-settings.ema

   as shown in Illustration 5.

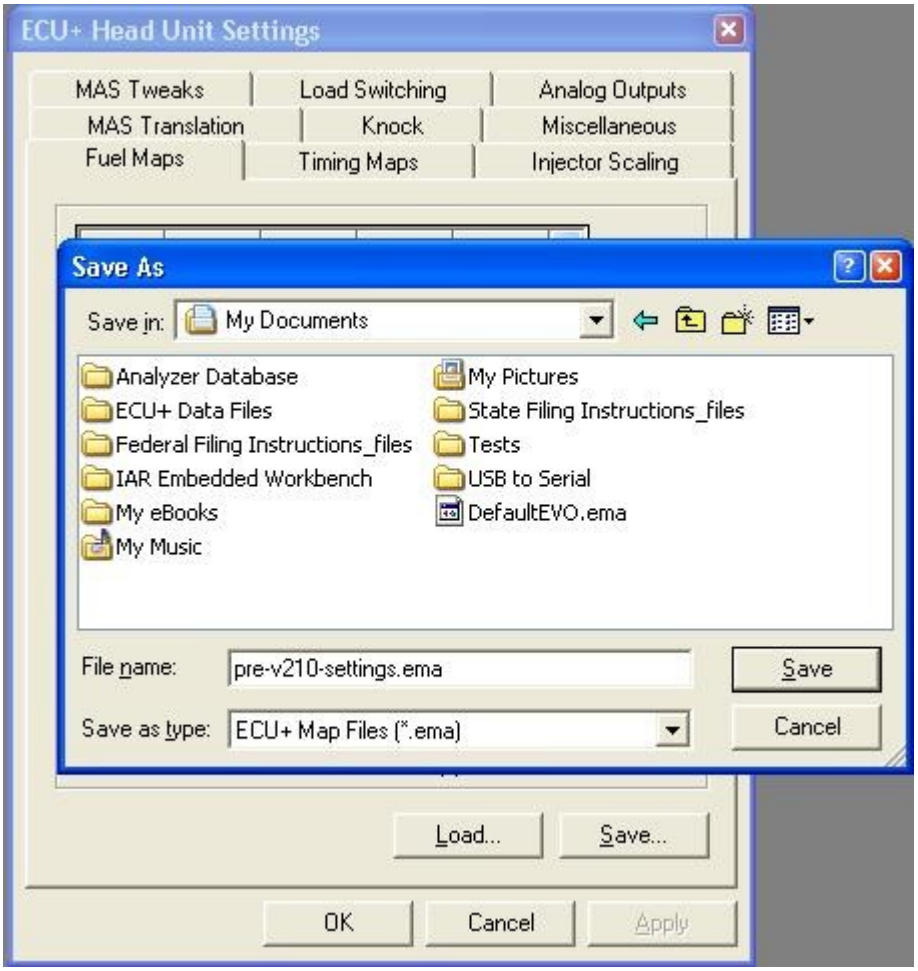

Illustration 5 - Saving your settings to disk

Note that saving your old settings is a **required** step. Do not skip it.

6 Upgrading the ECU+ Win Software

To upgrade your ECU+ Windows software to version 2.10, simply run the Setup.exe file supplied and follow the prompts. The new GUI installer will guide you through the installation. The new ECU+ software will be installed to the same directory as your existing ECU+ installation.

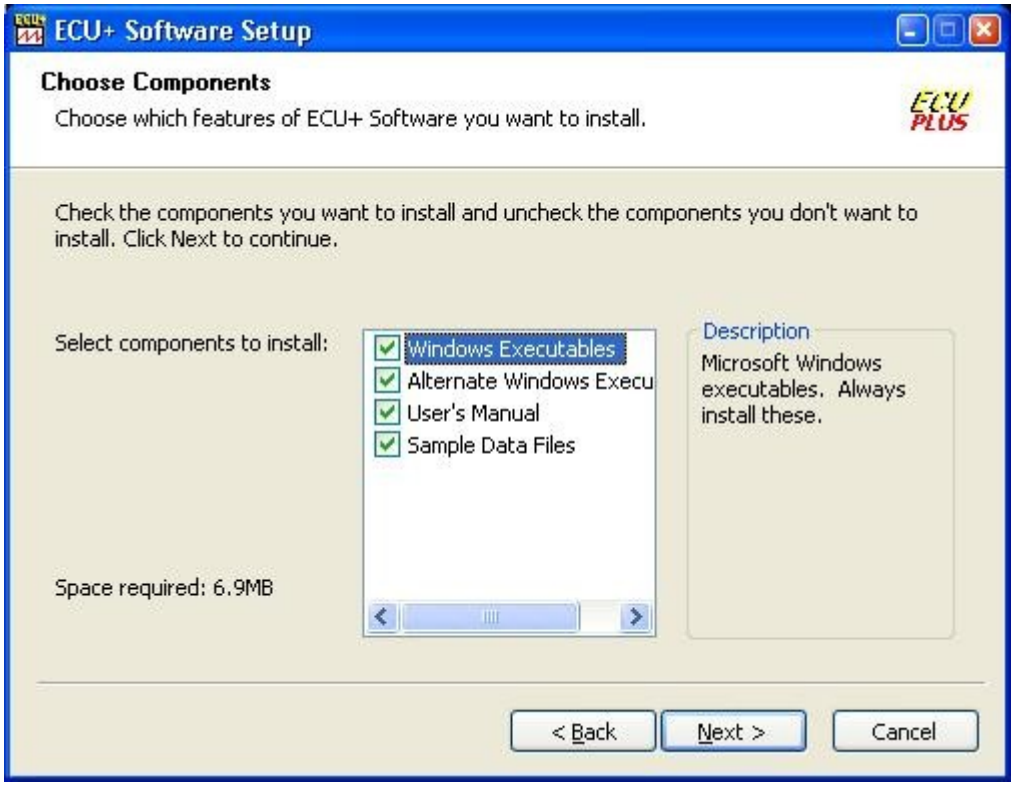

Illustration 6 - The first installation screen

If you have an Evolution VIII or IX, and plan to use the ECU+ alongside the EcuFlash tool, be sure to install the *Alternate Windows Executables*. All other customers can skip this step.

7 Upgrading the DSP Firmware

The ECU+ includes two microprocessors inside the silver box. The first microprocessor is the so-called "DSP" microprocessor. This microprocessor runs the engine and does the majority of the datalogging. The ECU+ software installation includes updated versions of this firmware that must be installed.

To upgrade the DSP firmware, follow the procedure outlined in section 8.2 of the ECU+ user's manual. Basically:

1. Connect your laptop to your ECU+ silver box.
2. Turn on the ignition, but don't start the car.
3. Open a command prompt: Windows Start menu->Run->"Cmd".
4. Change directories to C:\Program Files\EcuPlus\Firmware\DSP.
5. Execute the command:

   BtLdrW -4 -p1 <filename>

   where <filename> is dsp_ver210.hex for the released version of the ECU+ DSP firmware, or dsp_ver210_betaN.hex for the beta releases. The -p1 signifies that your laptop's COM1 port is connected to the ECU+ head unit. (Use -p2 for COM2, and so on.)

The firmware upgrade should complete without error. A sample screen is shown below.

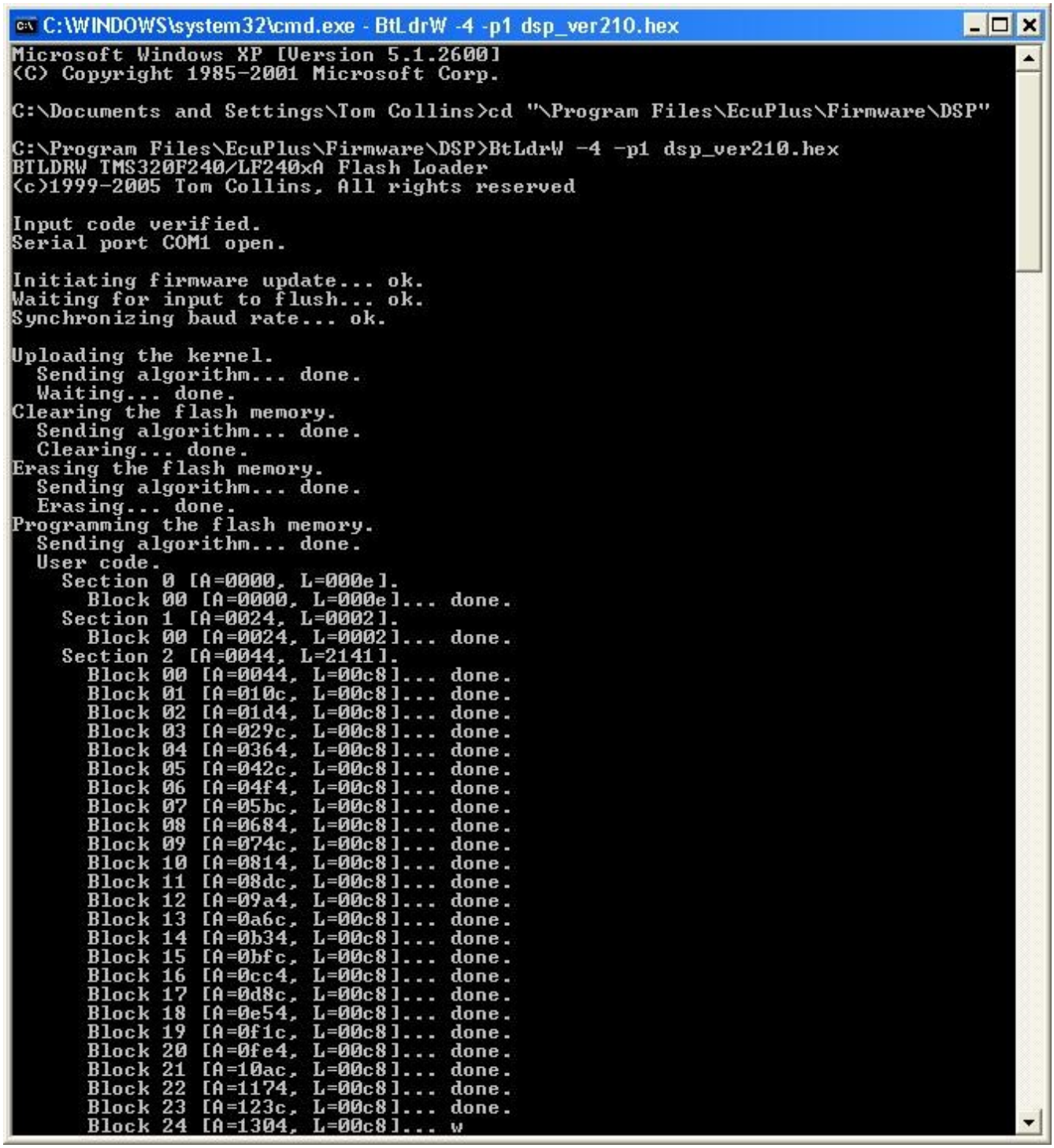

Illustration 7 - A sample run of the DSP firmware update utility

8 Upgrading the AVR Firmware

The second microprocessor inside the silver box is the so-called “AVR” microprocessor. This microprocessor talks to the OBD port on your stock ECU. The ECU+ software installation also includes updated versions of this firmware that must be installed.

To upgrade the AVR firmware, follow the procedure outlined in section 8.3 of the ECU+ user's manual.

Basically:

1. Connect your laptop to your ECU+ silver box.
2. Turn on the ignition, but don't start the car.
3. Open a command prompt: Windows Start menu->Run->"Cmd".
4. Change directories to C:\Program Files\EcuPlus\Firmware\AVR.
5. Execute the command:

   AvrProgW -p1 <filename>

   where <filename> is avr_ver110_1g.hex for the 1G DSMs or avr_ver110_2g_evo.hex, and the -p1 signifies that your laptop's COM1 port is connected to the ECU+ head unit. (Use -p2 for COM2, and so on.)

The firmware upgrade should complete without error. A sample screen is shown below.

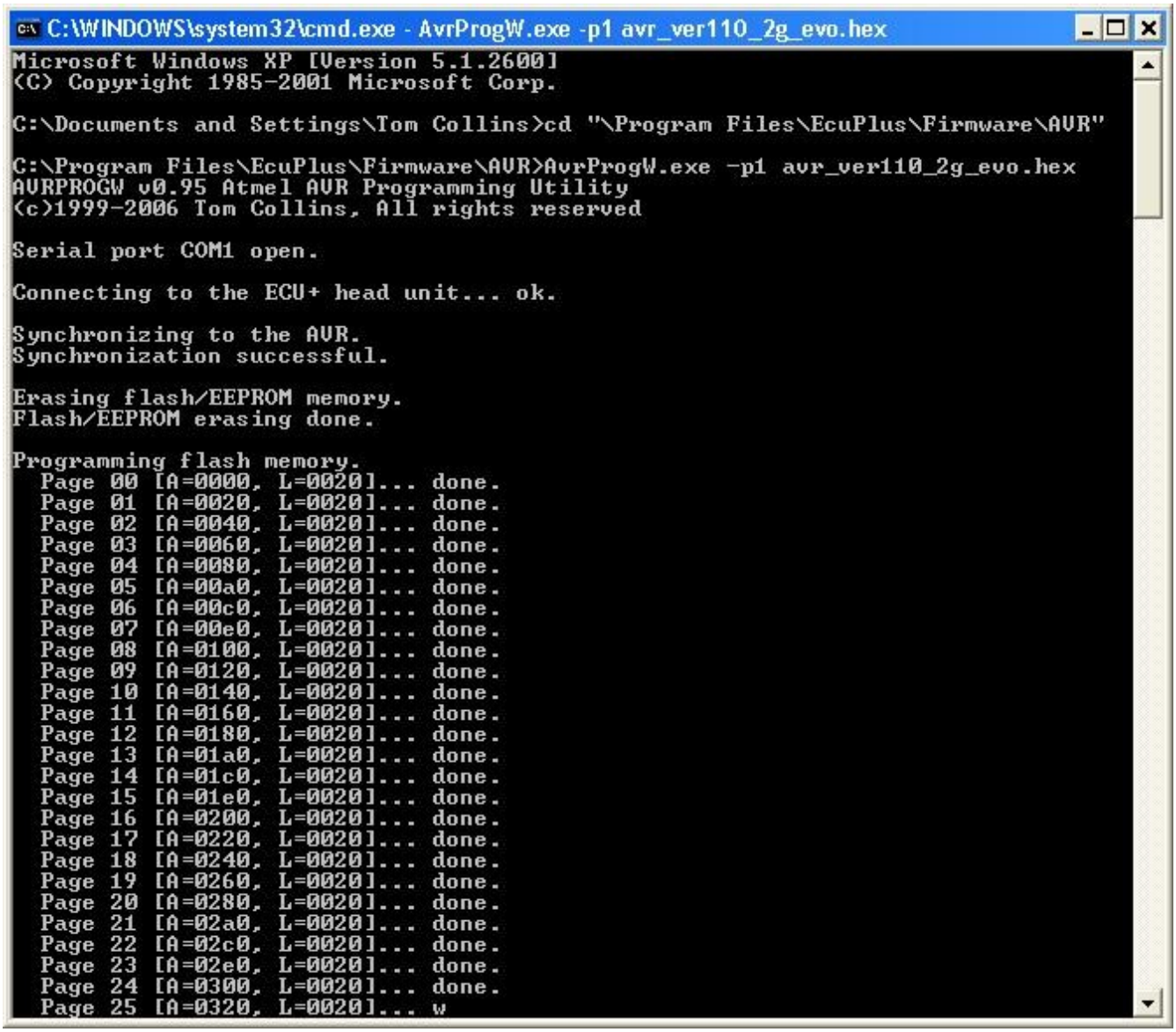

Illustration 8 - A sample run of the AVR firmware update utility

9 Restoring Your Configuration Settings (Required)

Once you've updated your firmware and software to version 2.10, you'll need to restore your ECU+ head unit settings from the .ema file where the settings were saved to in step 6. Again, this is a **required** step. To do so:

1. Connect your ECU+ black box to a laptop, and start up the (new version 2.10) ECU+ Win software.
2. Use the *Settings->ECU+ Head Unit* menu item to bring up your current head unit settings. They'll contain at least some garbage.
3. Click the *Load* button (available on any of the dialogs), and select the file:

   pre-v210-settings.ema

   Be sure all three of the checkboxes *Import fuel maps*, *Import timing maps* and *Import other parameters* are checked.

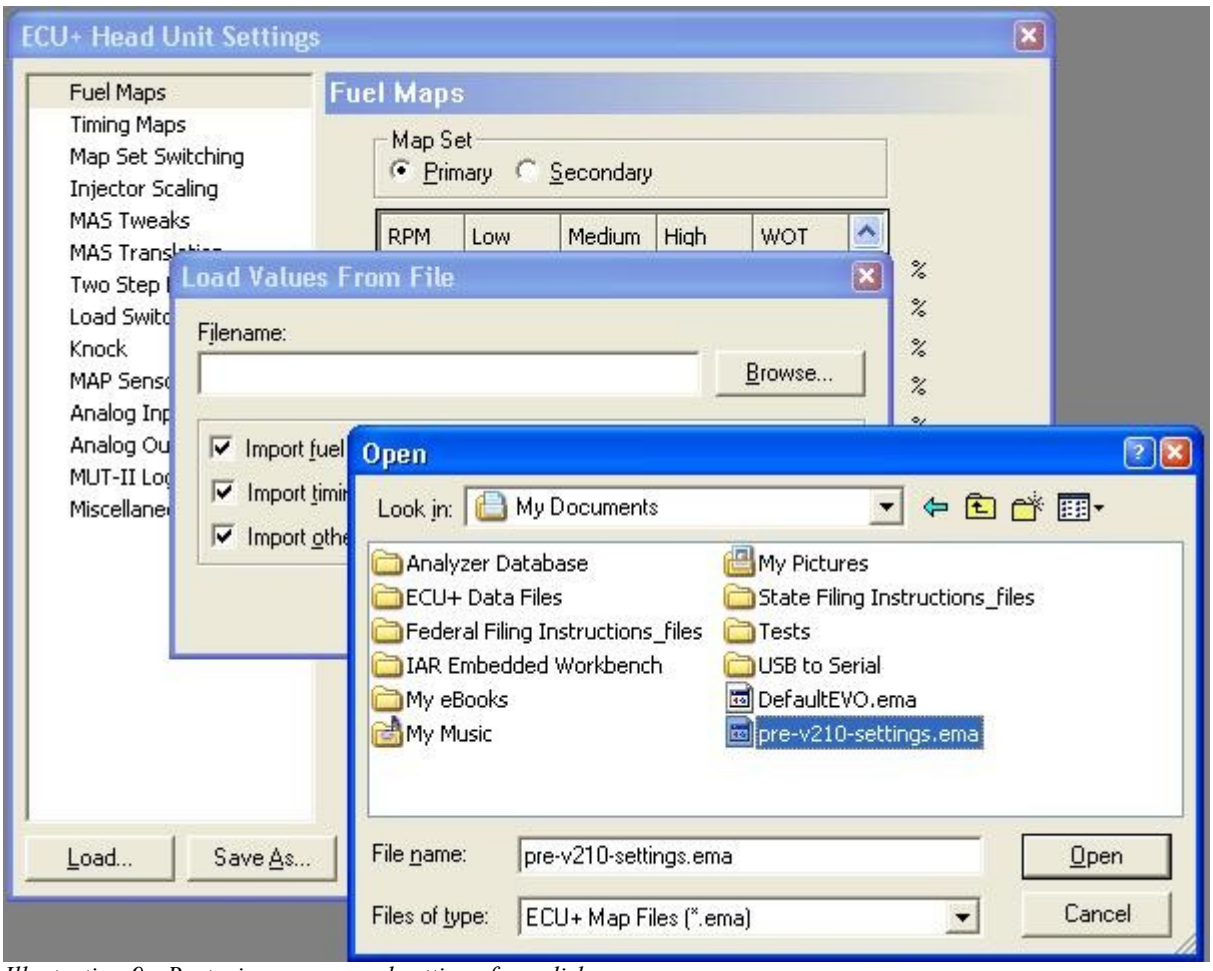

Illustration 9 - Restoring your saved settings from disk

4. Click *Ok* to load the saved values into the laptop's memory, and *Ok* again to save the settings to the ECU+ silver box head unit.

10 Wiring Changes

To take advantage of the new functionality in the ECU+ version 2.10 firmware, some changes to the

ECU+ wiring may be required depending on your car type and ECU+ head unit serial number. These wiring changes are all described in the ECU+ manual; this section points out what changes are necessary for what functionality.

10.1 No Lift to Shift – The Clutch Switch Wire

To use the ECU+'s no-lift-to-shift (NLTS) function, a connection between the "top clutch switch" and the ECU+ head unit is necessary. The clutch switch allows the ECU+ head unit to know when the clutch is depressed, and thus when to activate NLTS.

As described in the section Hardware Requirements on page 4, this feature requires that ECU+ head units with serial numbers of 2000-2099 be updated to match the hardware available in later units. Assuming you have an updated or later version of the head unit, there are two cases:

1. 1990-1999 DSMs – the clutch switch wire must be wired up manually, independent of whether or not you own a PnP ECU+.
2. 2003-2006 EVOs – the clutch switch wire is already wired for you on PnP ECU+'s, or must be wired manually on wire-it-yourself ECU+'s.

The clutch switch wiring is described in section 5.5.8 of the ECU+ user's manual.

10.2 The External Switch

As with the clutch switch input, this input is not available on ECU+'s with serial number 2000-2099 unless the hardware has been updated to match the hardware on later models of the silver box.

To external switch input is a 5 volt input that allows the ECU+ firmware to switch between two sets of fuel and timing maps based on an external input. This input can come from a physical switch or the output of a controller box (for nitrous, etc.). This always needs to be hand-wired on all ECU+'s.

The external switch wiring is described in section 5.5.9 of the ECU+ user's manual.

10.3 The Simulated Front O2 Output

The simulated front O2 output allows the ECU+ to generate a front O2 signal based upon the air/fuel ratio calculated by an attached wideband O2 sensor kit. This must be hand-wired if you want to use this feature.

The simulated front O2 wiring is described in section 5.5.7 of the ECU+ user's manual.

10.4 The 1G DSM OBD Connections

New in ECU+ firmware version 2.10 is support for the OBD connections on first generation (1990-1994) DSMs. Two wires must be newly-connected on these cars, as described in section 5.4.1 of the ECU+ user's manual. Note that one of the connections is on the "high current" connector, which previously only contained power connections.

11 Finishing Up

At this point, your hardware jumper settings are good-to-go, you have new firmware and software installed, and you're ready to try out some of the new features in the ECU+. To see what kind of new things are configurable, have a look at the main menu items *Settings->ECU+ Win* and *Settings->ECU+ Head Unit*. Also, *please* at least skim the ECU+ user's manual (now over 110 pages) for things that are new. If you choose to use the no-lift-to-shift feature or map set switching with an

external switch, there is a bit of additional wiring that needs to be done. Most of the other features are software/firmware-only, and just need to be configured.

12 Problems

If you have any problems with the upgrade to the ECU+ firmware or software, or if you find any bugs in the software, send an e-mail to support@ecuplus.com.

13 The Last Word

The ECU+ firmware and software version 2.10 involved over a year of hard work. Thanks to all of the folks who suggested features and enhancements.

If you like the ECU+, and want to encourage future firmware and software upgrades, there are two things you can do:

- Post on the forums at forums.ecuplus.com. Help others with their problems, and post good reviews of the product if you can. Posts like this encourage others to buy the product. Remember that the only income generated by the ECU+ is from new sales. Upgrades like this for existing customers are free.
- Tell your friends about the ECU+. The ECU+ is a one-man, low budget operation without a big advertising budget. Word of mouth is the best advertisement of all!

Tom Collins

tlcoll1@edgebbs.com